Addition

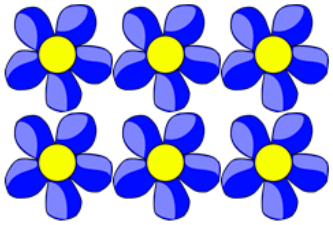
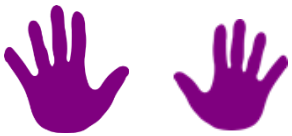
Foundation Stage 1 Objectives:

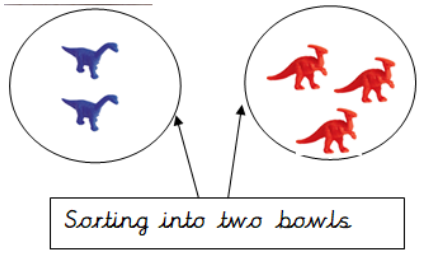
Birth to Three:

- Combine objects like stacking blocks and cups. Put objects inside others and take them out again.
- Take part in finger rhymes with numbers.
- React to changes of amounts in a group of up to three items.
- Compare amounts saying 'lots', 'more' or 'same'.
- Develop counting-like behaviour, such as, making sounds, pointing or saying some numbers in sequence.
- Counting in everyday contexts, sometimes skipping numbers – '1,2,3,5.'

Three – Four:

- Develop fast recognition of up to 3 objects, without having to count them individually ('subitising').
- Show 'finger numbers' up to 5.
- Link numerals and amounts: for example, showing the right number of objects to match the numeral, up to 5.
- Experiment with their own symbols and marks as well as numerals.
- Recite numbers past 5.
- Say one number name for each item in order: 1, 2, 3, 4, 5.
- Know that the last number reached when counting a small set of objects tells you how many there are in total ('cardinal principle').
- Solve real world mathematical problems with numbers up to 5
- Compare quantities using language 'more than', and 'fewer than'.

Concrete	Pictorial	Abstract
Nursery rhymes and number stories. Using numbers and objects in the environment   Counting using hands and through movement. Counting using concrete objects for 1 to 1 correspondence as well as for grouping and partitioning  	I can count …  	Writing the digit to represent the quantity 6 written as a representation e.g. IIIIII


Sorting into two bowls

Foundation Stage 2 Objectives:

Reception:

Understands 'one more than/one less than' relationship between consecutive numbers.

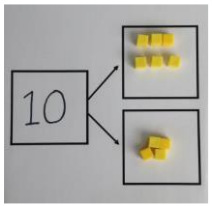
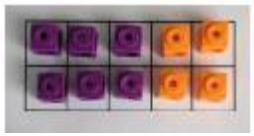
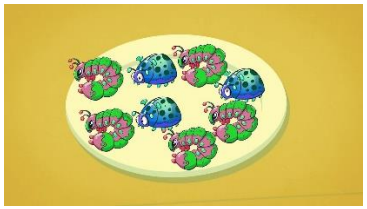
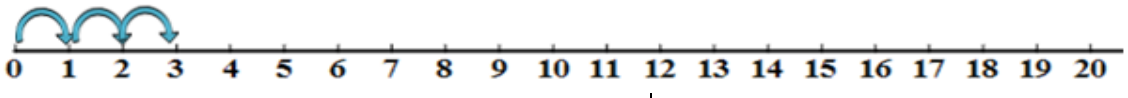
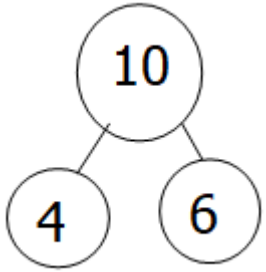
Explore the composition of numbers to 10.

Automatically recall number bonds for numbers 0 – 5 and some to 10.

Early Learning Goal:

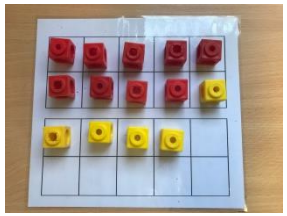
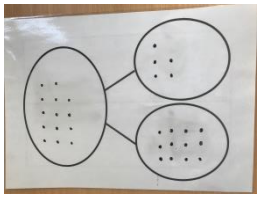
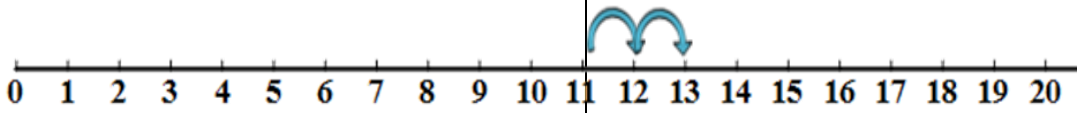
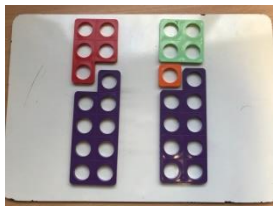
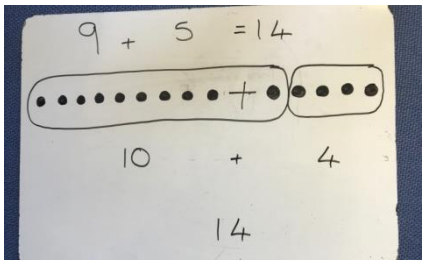
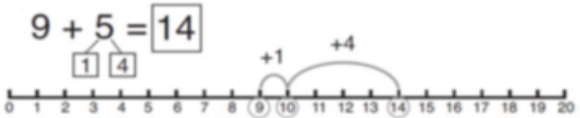
Have a deep understanding of numbers to 10, including the composition of each number.

Automatically recall number bonds to 5 and some number bonds to 10, including double facts

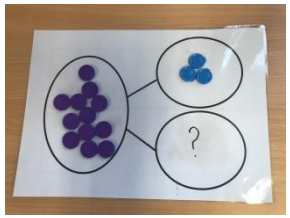
Concrete	Pictorial	Abstract
   Use objects and maths resources to add two numbers together as a group.   +   	Use pictures to add two numbers together.  5 + 3 = 8 	Children will annotate their pictures with number sentences.   4 + 2 = 6

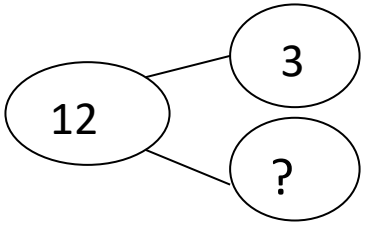
Year 1 Objectives:

- read, write and interpret mathematical statements involving addition (+) and equals (=) signs
- represent and use number bonds and related subtraction facts within 20
- add one-digit and two-digit numbers to 20, including
- solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as
- 17 = □ – 9

Concrete	Pictorial	Abstract
 Using resources to investigate the creation of numbers up to 20. First steps to bridging. Using place value – counting on in ones, using a number line, bead string and 100 square etc.	Drawing images to reflect concrete representations  Start with the larger number and count on.  	Writing the number sentences to support the pictorial 9 + 5 = 14
Progressing onto using knowledge of numbers bonds within 10 when crossing the tens boundary e.g. 9 + 5 = Start with the 9, then add 1 to make 10, then add the remaining 4. 	Use pictures or a number line. Regroup or partition the smaller number to make 10.   	Place the larger number in your head and count on the smaller number to find the answer. **5 + 9 = 14** **9 + 1 = 10** **10 + 4 = 14** If I have nine, how many more do I need to make 10? How many more do I add on now? 15 +1 = 16 16 = 15 + 1 (commutative law)

Finding missing numbers.





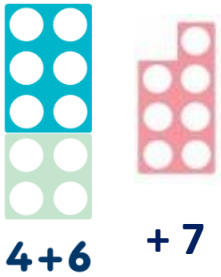
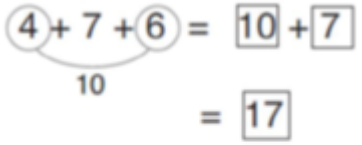
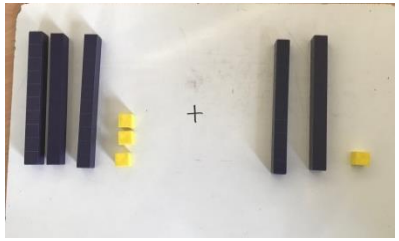
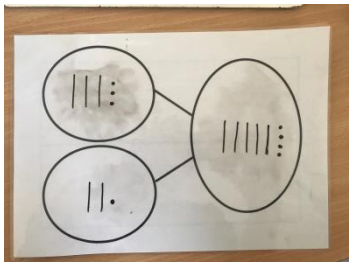
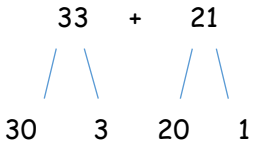
3 + ☐ = 12

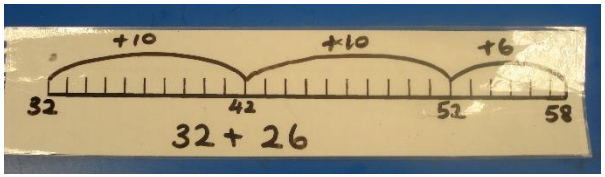
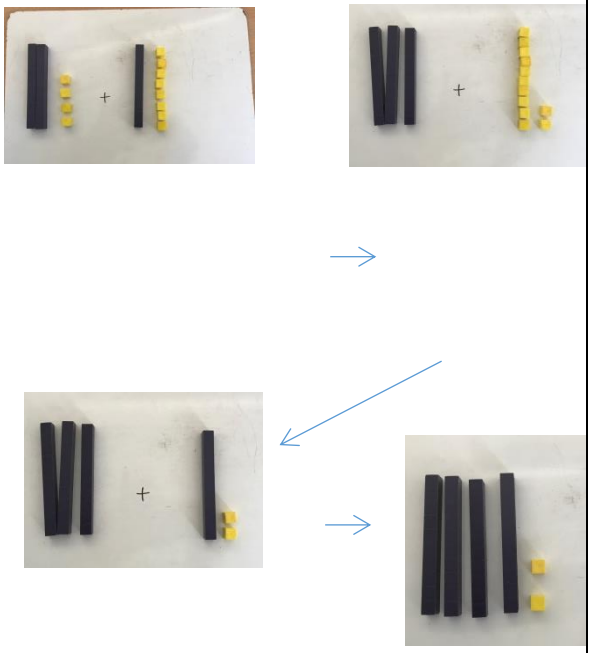
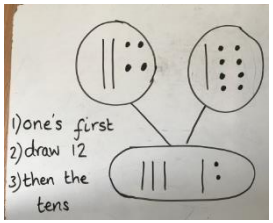
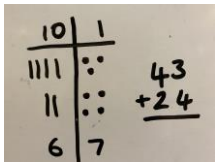
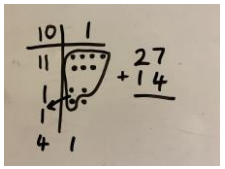
☐ + 6 = 15

Year 2 Objectives:

- solve problems with addition:
  - using concrete objects and pictorial representations, including those involving numbers, quantities and measures
  - applying their increasing knowledge of mental and written methods
- recall and use addition facts to 20 fluently, and derive and use related facts up to 100
- add numbers using concrete objects, pictorial representations, and mentally, including:
  - a two-digit number and 1s
  - a two-digit number and 10s
  - 2 two-digit numbers
  - adding 3 one-digit numbers
- show that addition of 2 numbers can be done in any order (commutative)

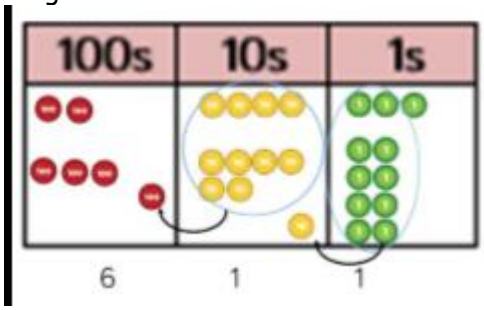
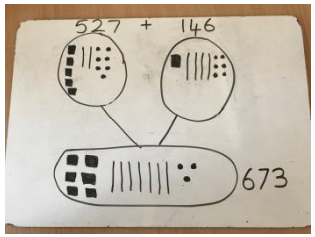
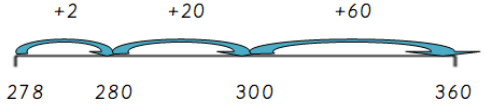
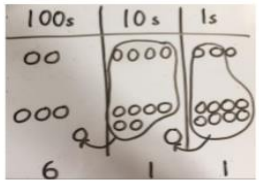
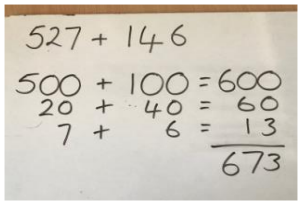
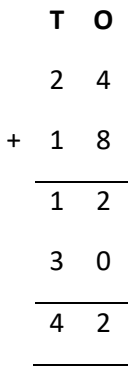
recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems

Concrete	Pictorial	Abstract
4 + 7 + 6 = 17 Put 4 and 6 together to make 10. Add on 7.  Following on from making 10, make 10 with 2 of the digits (if possible) then add on the third digit.	 Add together three groups of objects. Draw a picture to recombine the groups to make 10.	 Combine the two numbers that make 10 and then add on the remainder.
Partitioning both numbers into tens and ones 33 + 21 = 54 OR 21 + 33 = 54 	Start with the two parts and combine to create the whole (Representing the concrete). 	33 + 21 = 30 + 20 = 50 3 + 1 = 4 50 + 4 = 54 

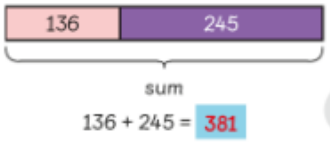
Adding the second number to the first by partitioning the tens and ones, using a variety of resources		
Use manipulatives to secure understanding of crossing 10's boundaries. 24 + 18 = 42 Add together the ones first then add the tens. Develop to include regrouping. 	   (moving on to informal addition with carries)	Progress onto the expanded written column method, with column headings. Up to 2 by 2 digits without crossing the 10s boundary initially but achieving by the end of the year. T O 2 4 + 1 8 1 2 3 0 4 2

Year 3 Objectives:

- add numbers mentally, including:
  - a three-digit number and 1s
  - a three-digit number and 10s
  - a three-digit number and 100s
- add numbers with up to 3 digits, using formal written methods of column addition
- estimate the answer to a calculation and use inverse operations to check answers
- solve problems, including missing number problems, using number facts, place value, and more complex addition

Concrete	Pictorial	Abstract
Use e.g. base ten, place value counters. Begin in the ones column. For every 10 created exchange for a 10 counter.  As children move on to decimals and money, decimal place value counters can be used to support learning.	Draw images to represent concrete resources:  These informal representations may be used to clarify understanding and can be used alongside number lines. It will also aid fluency in mental calculations.   	 Expanded written method, as in Year 2, also with three digit numbers. This will progress on to compact column method (which they continue to use in Year 4). We carry the digits above the line.

Find the sum of 136 and 245.



The Bar model (shown above) can reinforce the concept of part part whole.

	4	7	5
+	2	6	7
	1	1	
	7	**4**	**2**

Year 4 Objectives:

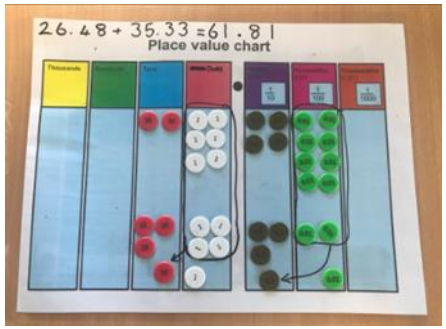
- add numbers with up to 4 digits using the formal written methods of column addition where appropriate
- estimate and use inverse operations to check answers to a calculation
- solve addition two-step problems in contexts, deciding which operations and methods to use and why

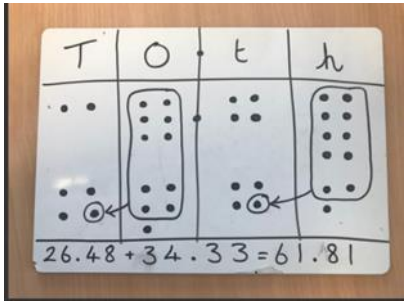
Concrete	Pictorial	Abstract
See above.	See above.	Formal written method with columns labelled. Progressing from adding 2 four digit numbers to adding 3 four digit numbers, not exceeding the thousands column. Build knowledge by crossing one boundary at a time, beginning with the tens. Develop understanding by moving onto crossing multiple boundaries, not following a set pattern. Variation – missing numbers.

	Th	H	T	O
	4	3	6	5
+	2	5	7	6
		1	1	
	6	**9**	**4**	**1**

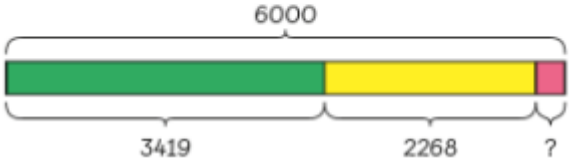
A line to be left to record numbers crossing boundaries above the answer.

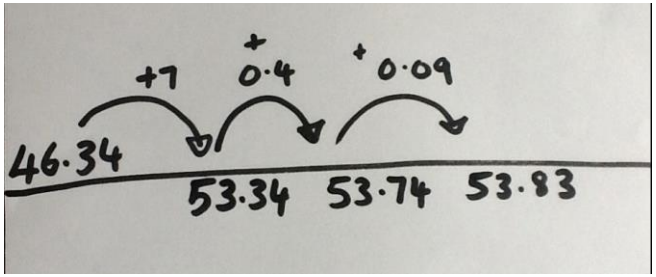
	Th	H	T	O
	4	3	6	5
+	2	5	8	6
	1	3	7	4
	1	2	1	
	8	**3**	**2**	**5**





There were 6000 books for sale at a book fair.
3419 books were sold on the first day of the fair and
2268 books were sold on the second day.
How many books were left at the end of the second day?





To promote fluency number lines can be used for addition of decimals

When secure, progress to adding money with two decimal places. Place value headings to be labelled.

		T	O		THS	HTHS
		2	9	.	4	5
+		2	5	.	2	9
		1		.	1	
	£	**5**	**4**	.	**7**	**4**

Year 5 Objectives:

- add whole numbers with more than 4 digits, including using formal written methods (columnar addition)
- add numbers mentally with increasingly large numbers
- use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy
- solve addition multi-step problems in contexts, deciding which operations and methods to use and why

Concrete	Pictorial	Abstract
See above	Where necessary do not be afraid to use the expanded method for initial explanation. Number lines promote fluency and are a clear assessment tool for teachers. Bar models to be used to support their understanding of problems – help them identify what they need to do.	Addition of 4 and 5 digit numbers to one million. TTh Th H T O 2 9 6 1 5 + 2 5 4 3 9 4 3 5 2 3 1 1 1 **9 8 5 7 7** Children provided with numbers where they have to decide whether to 'carry' or not – this will identify if they have a secure understanding of place value. Pupils to record numbers using commas e.g. 98,577 Addition of numbers with 2 decimal places in context e.g. money and measurement. H T O . ths hths 2 3 8 . 8 4 + 4 2 6 . 5 2 1 1 . **£ 6 6 5 . 3 6** Pupils to use estimation before completing calculations. Provide examples in context to support understanding of the importance of estimating. Use rounding to estimate. E.g. 423 + 158 + 296 = Estimate: 420 + 160 + 300 =

Year 6 Objectives:

- perform mental calculations, including with mixed operations and large numbers
- solve addition multi-step problems in contexts, deciding which operations and methods to use and why
- use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy

Concrete	Pictorial	Abstract
See above for concrete examples to use when beginning addition work to emphasise the need to exchange when you make ten and place value understanding.	**See above for pictorial images to use when beginning addition work.**	Pupils to record numbers using commas e.g. 2,598,577 Addition of numbers, not exceeding 10 million. 1 2 6 3 4 3 + 2 8 7 3 5 2 3 2 2 1 5 4 1 1 1 **7 3 5 8 4 9** Addition of numbers with up to 3 decimal places, using 0 as a place holder. 1 . 8 2 1 + 0 . 4 3 3 2 . 0 2 6 1 . 1 **4 . 2 8 0**